

CERAMIC MIXED PROTONIC/ELECTRONIC CONDUCTING MEMBRANES FOR HYDROGEN SEPARATION

Abstract

A multi-phase mixed protonic/electronic conducting material comprising a proton-conducting ceramic phase and an electron conductive ceramic phase. Under the presence of a partial pressure gradient of hydrogen across the membrane, a membrane fabricated with this material selectively transports hydrogen ions through the protonically conductive ceramic phase and electrons through the electronically conducting ceramic phase, which results in ultrahigh purity hydrogen permeation through the membrane. The material has a high electronic conductivity and hydrogen gas transport is rate-limited by the protonic conductivity of the material.